

10.2 day 3

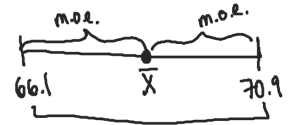
WARM UP:

1) I have a confidence interval for a population mean that is

(66.1, 70.9)

(a) what is the sample mean?

(b) what is the margin of error?

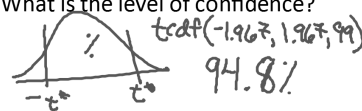


BONUS: $df = n - 1$

(c) What is the t^* if the sample size is 100 and the standard deviation is 12.2?

$$\bar{x} \pm t^* \left(\frac{s}{\sqrt{n}} \right)$$

(d) What is the level of confidence?



$$t^* = 1.967$$

$$m = t^* \left(\frac{s}{\sqrt{n}} \right)$$

$$2.4 = t^* \left(\frac{12.2}{\sqrt{100}} \right)$$

2) I have a confidence interval for a population mean that is (116.8, 123.2)

(a) what is the sample mean? $\bar{x} = 120$

(b) what is the margin of error? $m = 3.2$

BONUS:

(c) What is the t^* if the sample size is 150 and the standard deviation is 16.8?

$$3.2 = t^* \left(\frac{16.8}{\sqrt{150}} \right)$$

(d) What is the level of confidence?

$$t.cdf(-2.333, 2.333, 149)$$

$$= 97.9\%$$



95% Interval
(30, 40)

$$n = 100 \rightarrow 150 \quad t^* = 1.984 \rightarrow 1.976$$

99% conf

$\uparrow n$

margin of error? \uparrow

critical value (t^*)? \uparrow

Conf. int? \uparrow

wider

narrower

(25, 45)

* Get out 10.2 B worksheet from yesterday.

* I am passing back answers- check your answers!!

* Ask questions!

Cheat Sheet (10.2)

Conf. Intervals: ① conditions

$$\textcircled{2} \bar{x} \pm t^* \left(\frac{s}{\sqrt{n}} \right) = (a, b)$$

Program INVT

df

③ We are ___% conf. that the true average of ___ is btw. ___ and ___ units.

Test of Significance

① Conditions

② $H_0: \mu = \#$
 $H_a: \mu \neq \#$

$(df) = n - 1$

③ $t = \frac{\bar{x} - \mu}{s/\sqrt{n}} =$

④ $P(t \geq \text{---}) =$
 $t_{cdf}(LB, UB, df)$

If t is positive, $>$
 If t is negative, $<$
 If $H_a: \neq$, multiply by 2

⑤ Conclusion: If $p\text{-value} < \alpha$, reject
 If $p\text{-value} > \alpha$, fail to reject

We reject/fail to reject H_0
 b/c $p\text{-value}$ of --- is $</>$ $\alpha = \text{---}$.

We have sufficient/insufficient
 evidence that the true average
 of --- is (H_a).

Conditions:

- ① SRS
- ② $n \geq 30$
- ③ $\text{pop} \geq 10 \cdot n$

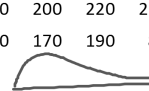
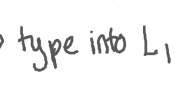
Bonus: $\uparrow \text{Conf}$ $\uparrow n$

10.2 Review:


1) Consumer Reports tested an SRS of 14 brands of vanilla yogurt and found the following numbers of calories per serving:

160 200 220 230 120 180 140
 130 170 190 80 120 100 170

$n = 14$

 $n = 35$  type into L1

a. Check the conditions (assume the population is normal)

- State Check
 1) SRS 1) stated 
 2) $n \geq 30$ 2) pop. normal, sample size is ok.
 3) $\text{pop} \geq 10n$ 3) there are more than 140 brands of vanilla yogurt

b. Find the mean and std. deviation

$\bar{x} = 157.86$ $s = 44.75$

c. Test the claim with a level of significance of 1%.

$H_0: \mu = 120$
 $H_a: \mu \neq 120$

$\alpha = 0.01$
 $\bar{x} = 157.86$
 $s = 44.75$
 $n = 14$

$t = \frac{157.86 - 120}{44.75/\sqrt{14}} = 3.166$

$(df = 13)$

$2 \cdot P(t > 3.166) = 2 * t_{cdf}(3.166, \infty, 13)$
 $= 0.00744$

We reject H_0 b/c $p\text{-value}$ of
 $0.0074 < \alpha = 0.01$.

We have sufficient evidence
 that the average calorie
 content of vanilla yogurt
 is not equal to 120 calories.

d. Create a 95% confidence interval for the average calorie content of vanilla yogurt.

$$157.86 \pm (2.160) \left(\frac{44.75}{\sqrt{14}} \right)$$
$$= (132.03, 183.69)$$

We are 95% conf. that the true average calorie content of vanilla yogurt is btw.

132.03 ^{*} 183.69 calories.
 [^]
 and

Complete #2 & 5 on separate paper

You do not need to check conditions- we will assume they are met already

We will be doing a "trade & grade"

2) $\bar{x} = 14.0$ $s = 8.6$
 $n = 26$ $df = 25$

$$14.0 \pm 2.485 \frac{8.6}{\sqrt{26}} = (9.81, 18.19)$$

We are 98% confident that the true average time spent doing housework is between 9.81 and 18.19 minutes.

5) $\bar{x} = 74.80$ $s = 9.45$
 $n = 40$ $df = 39$

$H_0: \mu = 75$

$H_A: \mu > 75$

$$t = \frac{74.80 - 75}{\frac{9.45}{\sqrt{40}}} = -0.134$$